M-32 Spur Bridge crossing the Thunder Bay River
Hillman, Montmorency County
Preferred Alternative

What is the Proposed Project?

Replace the existing M-32 Spur Bridge crossing the Thunder Bay River in the village of Hillman, Montmorency County.

The historic bridge was constructed in 1922 following Michigan State Highway Department standard plans. The camelback design was developed by D. V. Dewart, the first bridge engineer employed by the MSHD (precursor to today's MDOT) and is unique to Michigan, with some possible examples in Ontario. A subtype of the concrete through girder, the camelback bridge is known for the prominent arched outer girders. The subject bridge consists of two 75 foot spans, making the fifth longest surviving camelback bridge.

The M-32 Business Spur/ State Street Bridge is the only crossing within Hillman and is crucial for public safety and commerce in the community. While traffic volumes are light, much of the traffic consists of heavy trucks going to and from an industrial park on the north end of town. Downtown businesses rely on the bridge for much of their customer base and all of their deliveries. The crossing is crucial to public safety (police, fire, ambulance) services. The detour route to the next existing crossing adds 28 miles to any given trip, onerous to the average motorist, a serious detriment to commercial and emergency traffic.

Conditions on the bridge have been steadily deteriorating. A June, 2005 survey found that roughly 45% of the bridge surface was delaminated or spalled. Failure to address the problem in a timely manner will lead to establishing weight limits. Several businesses have indicating they would be forced to move operations away from Hillman if this occurs. This would deal a serious, if not fatal, blow to the local economy.

What is the Project Background?

A Preliminary Project Statement was created by the Michigan Department of Transportation in March of 1990. MDOT wanted to return this segment of M-32 to the City of Hillman but the city would not accept the turnback of the bridge. Hillman would only agree to the turnback if the camelback bridge was replaced. The complaint about the bridge was that it was too narrow with its ten foot wide lanes.

In December of 1993, a determination was made that the bridge in question was eligible for the National Register of Historic Places. This determination was completed by Margaret Barondess, then Staff Archaeologist for MDOT. Ms. Barondess gave the recommendation that the replacement of this bridge would constitute an adverse effect. The project would end up being reviewed under Section 106 of the NHPA and Section 4(f) of NEPA. Her recommendation was to strongly look into a bypass for the bridge

instead of demolition. The bridge was still structurally sound and from the available information there was not adequate justification to replace this bridge.

On April 17, 1995, the Village of Hillman conducted a council meeting on the issue of replacing the bridge. The council was told that the bridge was not on the National Register of Historic Places. The council preferred to see a plan for a new bridge that could handle the current traffic volumes. The council made a ruling to write MDOT to tell them they did not want the bridge placed on the National or State Register. The official letter was sent out June 13, 1995. Funding for the bridge replacement project was also discussed.

In May of 1996, discussion was started on getting together a Preliminary Public Involvement Plan. The date for the meeting was set for sometime in mid-June of that year. MDOT wanted to get a feeling for how the public really felt about the bridge and its replacement. The meeting was held for the public from the village and township. What came away from the meeting was that all but two people present endorsed the new bridge replacement. The District staff also endorsed the replacement of the bridge as well.

On September 25, 1996, MDOT submitted five alternatives for the bridge replacement project.

Alternative Plans for Camelback Bridge:

1. **No Build**

2. **Replacing existing structure on the same alignment**: This alternative involves removing the existing structure and building a completely new structure on the present roadway center line.

3. **Build new one-way bridge next to existing bridge**: This alternative involves constructing a new bridge next to the existing bridge with both bridges being used to carry traffic over the Thunder Bay River.

4. **Build a new two-way bridge and realign the roadway**: This alternative involves building a new two-way bridge adjacent to the existing structure and realign the roadway. The existing bridge would be refurbished and turned over to the Village to be used as part of a park.

5. **Build a new two-way bridge and connector roads at a new location**: This alternative involves building a new two-way bridge at a location east of the Village of Hillman that will provide an alternate route from the Industrial Park to M-32. This alternative involves no action to rehabilitate Or replace the existing structure.

Of these alternatives, Hillman Township approved only #2.

In January of 1997, the State Historic Preservation Officer, Kathryn B. Eckert, gave her recommendations on the project. She was in favor of any plans that would save

the historic character of the bridge. She was opposed to the complete replacement of the structure. The alternatives approved of were #3 and #4.

On February 1, 1998, Transportation Enhancement Fund Application was filed. The purpose of this application was for a feasibility study for relocating the camelback bridge. The firm of Wade-Trim and TY-Lin applied for the contract to do the study in January of 1999. On July 14, 1999, a Program Revision Request form was filed for project authorization. The study fell through and was never conducted.

In 2002 the study was changed to cover reviewing the cost analysis of relocating the bridge, further review of alternatives, and the development of preservation plans for the bridge. On October 12, 2004, a public comment meeting was held regarding the bridge project. During this meeting several concerns were discussed and the 1996 alternatives were considered again.

In the summer of 2006 an Environmental Assessment was begun. Seven Illustrative Alternatives were introduced, including five presented in a mid-1990s iteration of the proposed project.

What is the Purpose & Need for the Project?

The M-32 Business Spur/ State Street Bridge is crucial to the public safety, economy, and quality of life of the village and township of Hillman. It is the only north-south connection to the village. The route is necessary for emergency services, school buses, commercial vehicles, and residents and visitors needing access to and from the village.

The existing bridge is structurally deficient and functionally obsolete. The bridge has endured over eighty years of exposure to the elements, including freeze-thaw cycles. The concrete bridge has been subjected to years of road salt that have saturated the structure, speeding deterioration. An inspection summary indicated that weight limits would be needed if deterioration was not arrested quickly. The summary indicated serious delamination and spalling of the concrete and section loss to the steel rebar that laces the concrete structure together.

The existing bridge carries opposing traffic on two ten-foot lanes and accommodates pedestrians on a cantilevered sidewalk on the east side. The ten-foot lanes are substandard by current standards.

Traffic volumes are relatively light, accounting for 6300 vehicles per day on average. Commercial traffic accounts for about 7.5 percent of the daily traffic, but much of that traffic consists of log haulers and construction equipment haulers, which carry loads that are wider and heavier than typical. The narrow lanes are an issue, particularly when sharing (or attempting to share) the crossing with opposing traffic. Weight limits, if imposed, would be detrimental to much of the commercial traffic and could force some to relocate to other communities.

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What are the Illustrative Alternatives?

Seven Illustrative Alternatives were introduced at a public information meeting held at the Brush Creek Mill in Hillman on July 27, 2006. Included were the five Illustrative Alternatives discussed in the mid-1990s. Illustrative Alternatives represent a spectrum of reasonable options. Alternative One (No-Build) establishes a baseline for analysis of the other alternatives, and in some cases is selected as the project if funding or agreement cannot be achieved. Alternative Six (Build Two-lane Bridge on existing alignment) was the initial project recommendation.

The National Environmental Policy Act (NEPA) process requires that an agency undertaking a federally funded or permitted project must analyze all reasonable alternatives. The first test for a reasonable alternative is that it must be constructible. From that point the alternatives are analyzed to determine if the meet the project Purpose & Need and the types of benefits and impacts that each may include. Cost is not a major factor in the initial analysis, unless the cost of the alternative is clearly excessive when compared to the project's anticipated benefits. The basic intent is to identify those alternatives that best meet the Purpose and Need and that best avoid, minimize, or mitigate adverse impacts.

A broad range of environmental, cultural, and social factors are considered when determining the potential for adverse impacts. Each alternative poses a potential for adverse impacts. On the following page is a table introducing the Illustrative Alternatives with a brief discussion of impacts:

IA:	Action:	Discussion:
1	"No-Build"	Presumes no work beyond normal maintenance activities. This action would fail to address narrow lanes, and the bridge would continue to deteriorate. Weight limits would eventually be required, negatively impacting commercial, school and emergency vehicle use of the crossing. No Right-of-Way would be required.
2	Restore Existing	This action would follow the Secretary of Interior Standards for the rehabilitation of historic structures and would require considerable remedial work to assure structural integrity. Alone

		this action would not correct functional obsolescence. Additional Right-of-Way, some or all temporary, might be needed for grading purposes to correct the steep grade on the south side. The bridge would be shared one-way controlled by signals or signs.
3A west	Build One-lane Bridge adjacent to and retain existing bridge	This alternative would provide a one-way pair and assumes the existing structure would be appropriately rehabilitated. Alternative 3A places the new structure to the west of the existing bridge and would require additional Right-of-Way, and would impact Section 4(f)/6(f) parkland and commercial property. No detour would be required.
3B east	Build One-lane Bridge adjacent to and retain existing bridge	This alternative would provide a one-way pair and assumes the existing structure would be appropriately rehabilitated. Alternative 3A places the new structure to the east of the existing bridge and would require additional Right-of-Way, and would have residential and commercial relocations. No detour would be required.
4A west	Build Two-lane Bridge adjacent to and retain existing bridge	The new bridge would carry motor vehicles only, the existing bridge would be rehabilitated for non-motorized traffic. Impacts described above in 3A would be increased. No detour would be required.
4B east	Build Two-lane Bridge adjacent to and retain existing bridge	The new bridge would carry motor vehicles only, the existing bridge would be rehabilitated for non-motorized traffic. Impacts described above in 3B would be the same or somewhat greater. No detour would be required.
5A west	Build Two-lane Bridge adjacent to and demolish existing Bridge	The new bridge would carry two-way vehicular traffic and would include accommodations for non-motorized traffic. Impacts would be similar to 4A. . No detour

		would be required.
5B east	Build Two-lane Bridge adjacent to and demolish existing Bridge	The new bridge would carry two-way vehicular traffic and would include accommodations for non-motorized traffic. Impacts would be similar to 4B. . No detour would be required.
6	Build Two-lane Bridge on existing alignment	This Illustrative Alternative would require a detour or the use of an adjacent temporary crossing. A temporary crossing would require additional Right-of-Way on either the west or east side of the existing bridge. A detour would be of long duration, potentially long distance and may require roadway and/or bridge/culvert upgrades to accommodate heavy trucks. Requires demolition of historic bridge.
7	Build new Two-lane Bridge on new alignment, rehabilitate existing bridge.	The location of the new alignment would likely be on a route with the closest proximity to the industrial park. Additional Right-of-Way would be required to accommodate construction of new roadway connections and possible upgrade of some existing roadway. This Illustrative Alternative would require substantial local participation.

What are the Practical Alternatives?

By autumn, 2006 the list of Illustrative Alternatives was winnowed down to three Practical Alternatives. The alternatives carried forward were Alternative One (No-Build), Alternative Two (Restore Existing) and Alternative Six (Build Two-lane Bridge on Existing Alignment).

Alternative One is carried forward as the analysis baseline (or as a fallback if funding or other project-related problems arise). It does not meet the Purpose and Need because general maintenance will not arrest the ongoing deterioration, in time leading to weight restrictions. Functional obsolescence would not be addressed unless traffic was managed by making the crossing a shared one-way. [The structural and functional issues are discussed in greater detail below]

Alternative Two would require a full restoration of the aesthetic and structural qualities of the bridge. This alternative avoids adverse impacts to the historic bridge, avoids long-term impacts to parkland (see maintaining traffic, below) and avoids impacts to residential and commercial properties. To fully meet the Purpose and Need, the alternative would require signing or signalizing the bridge for use as a shared one-way structure.

Alternative Six proposes a new two-lane bridge on the existing alignment. This alternative would fully satisfy the project Purpose and Need but would require the demolition of the historic bridge, an adverse effect under Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act. Maintaining traffic would entail temporary impacts to parkland, also protected under Section 4(f).

What is the Preferred Alternative?

In December, 2006 analysis indicated a Preferred Alternative, Build Two-lane Bridge on Existing Alignment. This alternative would best meet the project Purpose and Need and has received strong community support.

The new bridge would carry two twelve-foot lanes and would include pedestrian facilities on one or both sides. The design will be aesthetically appropriate and will reflect community input. The overall design theme, based on public comment to date, would recall the architecture of the historic bridge.

Why were other alternative dropped from consideration?

The alternatives were tested to determine how each met the Purpose and Need and to identify the possible impacts of each. Through this process several alternatives were determined to not be Prudent and Feasible because the potential for impacts was too great, or because avoidance or minimization of impacts would modify the alternative to a point it did not meet Purpose and Need, or because costs were excessive when compared to the project intentions. Alternative One was discussed above, but following is a discussion of the rationale for discontinuing other alternatives.

Illustrative Alternatives Three A through Five B and Illustrative Alternative Seven were determined to carry excessive impacts and potential impacts and excessive costs. Alternative Seven proposed the erection of a new bridge at an off-site location and would require the construction of new connecting roadway. This would require the purchase of considerable right-of-way, potential serious environmental impacts, and would not address conditions on the existing bridge (assuming that only normal maintenance would

be performed). Combining this alternative with even a modified Alternative Two would be cost prohibitive.

Illustrative Alternatives Three A, Four A, and Five A would place new one- or two-lane structures adjacent to the west side of the existing bridge. These alternatives would require considerable right-of-way and would adversely impact the Brush Creek Mill property, the parkland on the south (including Emerick Park, which is protected under 6(f) of the Land and Water Conservation Fund and Section 4(f)) and all or most of the west side of the first commercial block to the north of the crossing. The B versions of these alternatives would avoid the park impacts but would require taking all or most of the first commercial block north of the bridge. On the south side there would be commercial and residential takes and impacts to a sewer lift station (located adjacent to the SE end of the bridge).

Although carried forward as a Practical Alternative, Alternative Two was removed from consideration because of issues surrounding restoration and because it does not address the functional obsolescence of the bridge. This alternative was preferred by preservationists but analysis indicated that the proposal was not Prudent and Feasible.

While restoration work could be performed several issues arose. First of all, the overall baseline estimate for material replacement (concrete and rebar) is 45 percent. In some specific areas the estimate jumps to about 65 percent. A reasonable guess to actual replacement percentages would likely exceed 50 percent. With such high replacement percentages comes concern that it would be difficult to warranty an adequate life cycle for the rehabilitation, particularly considering the project would be applying new material to old, substandard concrete.

A strategy for addressing functional obsolescence recommended using the bridge as a shared one-way structure to safely accommodate log haulers and other wide-load bearing rigs. This already occurs on a periodic, informal basis but is not practical as part of a project meant to address deficiencies. Under the proposed strategy the bridge would be signalized to manage the shared one-way function. The proposal was analyzed and some key problems were identified.

There is a sharp grade on the south side of the bridge approach. Because of this, northbound trucks have a difficult time stopping before the bridge, especially in wet/icy conditions. To reduce potential conflicts caused by this condition the signal would need to be placed at a considerable distance south of the bridge, creating possible queuing issues. Queuing would be a minor issue at Lynn Street (on the SE side of the bridge) and a minor to moderate problem at Pleasant Valley Road (on the NW side of the bridge). An existing sightline problem at the Pleasant Valley/M-32 Spur junction would not be corrected under this alternative.

Will a detour be required?

All of the alternatives would, to a variable amount of time, require full closure of the crossing. Detouring traffic using existing alternate crossing would add a minimum of 28 miles to any given trip and would require potentially substantial upgrades. A detour of this distance and any notable duration would be unacceptable for emergency services and onerous for school buses, commercial traffic and regular motorists. Pedestrians (and other non-motorized users) could not endure any detour of this length. Several local commercial operations have indicated that they would not be able to survive a detour and would close up or move their business elsewhere.

MDOT is investigating the installation of a temporary bridge that would be located adjacent to the west side of the existing bridge. The bridge, which would accommodate motorized and non-motorized traffic, would be placed prior to the start of work on the existing crossing and would be removed at completion of the project.

Temporary right-of way would be needed from the baseball field on the south side of the bridge, and on the north side from Brush Creek Mill's yard and parking area and possibly from a parking lot north of Pleasant Valley Road. These areas would be restored to conditions equal or better than conditions at the start of the project.

How long would the project take if the Preferred Alternative is approved?

A temporary bridge and supporting roadwork would be conducted in the autumn or winter before the new bridge would be built. This would permit traffic to be maintained while the existing bridge is demolished over a three week period during the winter.

Construction of the new bridge would be conducted over one normal construction season (spring through fall).

What are the costs for the project?

Not all the costs have been determined yet, but some early estimates include:

Demolition: $400,000

Temporary Crossing: $500,000

New Structure: $2.44 Million (includes Preliminary and Construction Engineering)

Are there other projects being considered for this corridor?

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MDOT is planning to reconstruct M-32 BS/State Street. The project will include streetscape improvements and will be coordinated with the bridge project.

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http://www.michigan.gov/mdotstudies and click on the project link "M-32 Spur Bridge Improvement Study."